NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

PUMPED WELL DRAIN

(No.)

CODE 532

DEFINITION

A well sunk into an aquifer from which water is pumped to lower the prevailing water table.

SCOPE

This standard applies to drilled or driven wells used for pumping ground water to lower the water table level in a given area. It does not apply to vertical drains, sometimes called drainage wells, constructed to discharge drain effluent into porous underground formations. Pumps. motors, or other appurtenances needed to pump water from the aquifers are not included.

This standard does not apply to test wells established for investigational purposes before the installation of a permanent well because they are considered temporary.

PURPOSE

To provide subsurface drainage by lowering the prevailing water table to a level that will provide maximum benefits to crops or soils by removing excess ground water and/or salts from the soil profile.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to areas that have a high water table and are in need of subsurface drainage, where pumping from wells is feasible. This requires a permeable aquifer at a depth and of such thickness and magnitude that, when pumped, will lower the water table to the desired degree.

An adequate outlet for the pumped drain water, considering its quantity and quality, must be available.

DESIGN CRITERIA

Quantity of water. The amount of ground water to be pumped from the well or wells shall be that required to provide the desired drawdown in the area being drained.

Multiple well drains. If more than one well is used in the system, the cones of depression developed by each shall overlap to such an extent that the points of least drawdown will be at the desired level after drainage.

Depth and diameter. The well depth and diameter shall be of such that the amount of water that can be drawn from the aquifer is sufficient to maintain the desired drawdown throughout the crop-growing season. Gravel envelopes may be used in conjunction with screens to serve as a filter and to increase the effective diameter of the well.

Casing. All wells shall be cased with steel, concrete, plastic, asbestos-cement, or other material of adequate strength and durability. The casing shall have a diameter that is adequate to accommodate the required pumping equipment.

Screens. All wells shall be equipped with manufactured screen sections, well points, shop-perforated metal casing sections, or field-perforated sections meeting the criteria stated below.

The screen openings for aquifer material of near uniform size shall be slightly smaller than the average diameter of the aquifer material. For graded aquifer materials (of non-uniform gradation), the screen openings shall be of such that 25 to 40 percent of the aquifer material is larger than the screen opening.

A sufficient length of screen shall be provided to maintain the entrance velocity of water into the well

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at an acceptable level, preferably less than 1/10 ft/s.

The position of the screen in the well shall be governed by the depth of the aquifer below the ground surface and the thickness of the aquifer to be penetrated by the well.

Quality of water. If the water from the well drain is to be used for human consumption, it shall meet all requirements of the state health department or other state agencies having jurisdiction. If the water has a high salt content or is not potable, means of disposal shall be planned and installed concurrently with the installation of the well, which will not adversely affect potable water sources and the environment.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing pumped well drains shall be in keeping with this standard and shall describe the requirements for properly installing the practice to achieve its intended purpose.

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CONSERVAITON PRACTICE SPECIFICATIONS

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ALIGNMENT

Drilled or driven wells shall be round, plumb, and aligned so as to permit satisfactory installation and operation of the pumping equipment to be inserted in the well.

WELL DEVELOPMENT

The well shall be developed until it has ceased to produce detrimental quantities of sand and until the continuous discharge rate is 20 percent greater than the anticipated normal production rate.

WELL RECORD

As construction progresses, the contractor shall keep an accurate well log of the types of materials encountered and the depths at which they are encountered, the depth and thickness of the water-bearing strata, progress in sinking the casing, the static water level, and the maximum drawdown. He shall also keep an accurate record of development and test operations.

Wells shall be installed according to the specifications for well (642).

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Planning considerations for water quantity and quality

Quantity

1. Effects of the cone of depression on adjacent water uses and users.
2. Downstream effects of the pumped water.

QUALITY

1. Effects of the quality of pumped water on the surrounding environment, water uses, or water users.
2. Effects of well pumping on soil and water salinity.
3. Effects of discharges of pumped water on downstream water temperatures.
4. Temporary and long-term effects on the visual quality of downstream waters.

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